**Nucleolar Organizer Regions (NORs) in *Drosophila immigrans* Sturtevant and *Drosophila repleta* Wollaston.**

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In *Drosophila*, as also in various tissues of many eukaryote systems, the nucleolus manifests as a round or oval structure organized by a specific region of the genome commonly known as the nucleolar organizer. In many systems, as in *Drosophila* larval salivary glands, the nucleolus is a very prominent body often attached to the chromocentric region through a bundle of thread-like structures. The thread-like connections seem to penetrate into the nucleolar mass and from different patterns of distribution in the nucleolar matrix.

In Figure 1, the Nucleolar Organizer Region (NOR) in *Drosophila immigrans* Sturtevant is present in X and microchromosomes.

In Figure 2, the Nuclear Organizer Regions (NOR) in *Drosophila repleta* Wollaston as evident from the photograph is present in both X and microchromosomes.

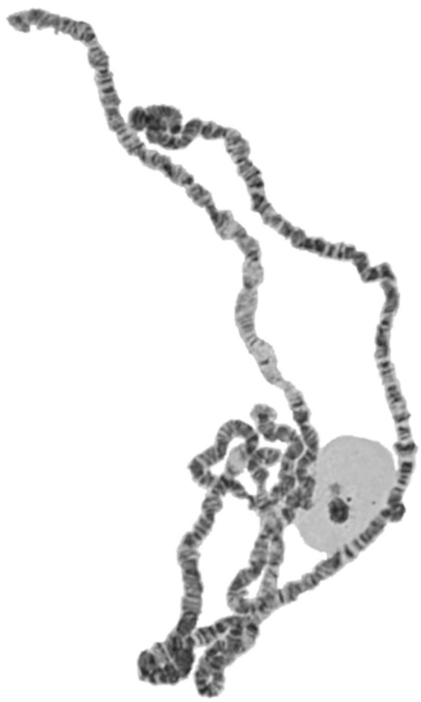

Figure 1. Location of Nucleolar Organizer Region (NOR) in X and 4th chromosomes.

Figure 2. Localization of Nucleolar Organizer Region (NOR) in *Drosophila repleta*.

**Morphology variation between *D. mettleri* collected from different host species.**

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*Drosophila mettleri* Heed, 1977 is a soil-breeding cactophilic species associated with the large columnar cacti species in the Sonoran Desert, cardon *Pachycereus pringlei*, and saguaro *Carnegiea* *gigantea*. Nevertheless, *D. mettleri* is considered a generalist, as it can also be collected from other columnar cacti in the Sonoran Desert such as senita *Lophocereus schottii*, echo *P. pecten,* and organ pipe *Stenecereus thurberi.* On the other hand, two *D. mettleri* populations in California switch hosts from columnar cacti. *Drosophila mettleri* uses *Ferrocactus* spp. in the Mojave Desert and *Opuntia* spp. on Catalina Island (Heed, 1978; Heed and Mangan, 1982).

Although host shifts in *Drosophila mettleri* imply behavioral and physiological adaptations, so far no morphological differences between *D. mettleri* populations using different types of cacti as breeding resources have been observed (Castrezana and Markow, *in review*; Castrezana, *personal observation*).

In the present note, I give details of an unexpected observation of morphological differences between *D. mettleri* collected from different host species within a single location. On October 2000, University of Arizona researchers collected *Drosophila* flies at Organ Pipe National Monument (OPNM), in the area known as senita basin (31.93°N, 112.86°W). This area has abundant organ pipe and saguaro cacti but less than one-hundred senita plants. We collected *D. nigrospiracula*, *D. mojavensis, D. pachea,* and *D. mettleri* from both banana baits and natural rots of the mentioned cacti (Table 1).

Table 1. *Drosophila* collections in Organ Pipe National Monument, Arizona (10/2000): Natural rots and banana baits.

| Species | Senita *Lophocereus schotti* | Saguaro *Carnegiae gigantea* | Banana baits | Total |
|---|---|---|---|---|
| *Drosophila nigrospiracula* | - | 229♀ 273♂ | 91♀ 61♂ | 654 |
| *Drosophila pachea* | 31♀ 29♂ | 7♂ | 1♀ 11♂ | 79 |
| *Drosophila mettleri (A)* | 34♀ 89♂ | - | 6♀ 7♂ | 136 |
| *Drosophila mettleri (B)* | - | 3♀ 5♂ | 5♀ 2♂ | 15 |
| *Drosophila mojavensis* | - | - | +80 | N/A |

Table 2. Time to copulation and percent of males unable to detach after copulation in three strains of *Drosophila mettleri.*

| Strain | N | Time to copulation | % pairs stuck after mating |
|---|---|---|---|
| OPNM (A) | 28 | 380.6 ± 5.6 | 21.4% |
| OPNM (B) | 21 | 374.9 ± 8.8 | 0.0% |
| Superstition | 71 | 374.4 ± 6.6 | 0.0% |
| Sup♀ x OPNM(A)♂ | 10 | 407.6 ± 14.0 | 80.0% |
| Sup♀ x OPNM(B)♂ | 8 | 357.8 ± 14.2 | 0.0% |

An anatomical review showed that *D. mettleri* individuals from OPNM could be distinguished in two different morphological types. The *D. mettleri* "type B" was collected from both banana baits and saguaro rots. Individuals of this type exhibited no morphological differences from other *D. mettleri* populations in the species distribution. On the other hand, *D. mettleri* "type A" individuals, which were collected directly from senita rots, were morphologically different from typical *D. mettleri* "B". Compared to "type B", *D. mettleri* "type A" has the following unusual characters: a)ground thorax coloration is reddish; b)Thorax dot-pattern is smaller and perhaps more fused; c) testes are slightly more reddish; d) the ventral margins of the epandrium are more straight and reddish; e) a reduction of 1-2 presisetae teeth (n = 5 males)

Both OPNM *D. mettleri* strains were maintained in potato-saguaro food with pieces of senita cacti for strain "type A" and pieces of saguaro for "type B" to stimulate female oviposition (Castrezana, 1997). Later, in March 2001, *D. mettleri* males from both OPNM strains were used in a no-choice test with *D. mettleri* females from Superstition Mountains, Arizona (33.38°N, 111.37°W), a stock established in March 1997. Data on the time to copulation are presented in Table 2.

The analysis of variance for the time until copulation did not differ between couples ($F_{4,133}$ = 1.5798, P = 0.18). However, a problem following copulation was detected in the OPNM (A) strain. 21.4% of *D. mettleri* OPNM (A) males got stuck after mating with their own females. Nonetheless, in less than two minutes, all pairs were separated. On the other hand, eight of ten pairs (80%) had this problem when the female was from Superstition and the male was from the OPNM (A) strain. Moreover, in six cases the males were unable to break away from the female and both individuals died after three hours. The remaining two pairs produced fertile offspring.

Unfortunately, because of difficulties associated with maintaining *D. mettleri* in the laboratory, the strains used in the present note were lost and access to senita basin area in Organ Pipe National Monument is currently prohibited. Nevertheless, the failure to detach following copulation was also observed in another *D. mettleri* population collected from senita in San Ignacio, Baja (28.03°N, 113.40°W). So, it is possible that a number of important changes occurred in *D. mettleri* flies while using the highly toxic senita cactus. In fact, recently, important molecular differences between OPNM (A) and OPNM (B) were discovered from studies of DNA vouchers. Perhaps in the future, detailed ecological, behavioral, and molecular studies will reveal the extent of differentiation between *D. mettleri* that breed in different host species.

References: Castrezana, S., 1997, Dros. Inf. Serv. 80: 92-93; Heed, W.B., 1977, Proc. Entomol. Soc. Wash. 79: 649-654; Heed, W.B., 1978, In: *Proceedings in the Life Science. Ecological Genetics: The Interface.* (Brussard, ed.), pp.109-126, Springer-Verlag, Berlin; Heed, W.B., and R.L. Mangan 1986, In: *Genetics and Biology of* Drosophila, vol. 3e (Ashburner, M., H.L. Carson, and J.N. Thompson, jr., eds.), pp. 312-345, Academic Press, London.

## Studies on the Nucleolar Chromatin Threads (NCT) of *Drosophila immigrans* Sturtevant and *Drosophila repleta* Wollaston collected from Kumaon region, India.

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### Introduction

The nucleolus in giant cells of larval salivary glands of *Drosophila* reveals typical thread like structures which have been shown to be DNA in nature (Barr and Plaut, 1966). Very likely these DNA threads are looped out from the main chromatin and contains the r-DNA sequences in the manner the DNA loops out in the puffs (Chowdhry and Godward, 1979). However, an interesting feature observed about these threads in *Drosophila* is that the pattern of the thread like connection in the matrix of the nucleolus is not constant. The pattern varies not only within the species (Barr and Plaut, 1966), but within the same species there is a considerable degree of variation in the morphological configuration of the threads.